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ABSTRACT

This manual offers guidelines for training of personnel involved in the manufacture of bricks, including employment practices; handling and preparation of raw materials; making, drying, firing, sorting, packing, and loading of bricks. A major emphasis is placed on industrial safety. (MF)

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Ceramics Glass and Mineral Products Industry Training Board

ED039506

Training Guidelines

Bricks Operatives

AC 008121

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TRAINING GUIDELINES FOR

OPERATIVES IN THE BUILDING

BRICK INDUSTRY

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INTRODUCTION

These guidelines have been prepared by the working party on operative training set up by the Bricks and Refractories Committee.

Their purpose is to assist each separate manufacturing unit to prepare its own programme for the systematic training of operatives. Formed in general terms, they can be adapted to the individual needs of each situation. They cover the introduction of any new entrant to general production activities and, separately, each of the main production tasks in the industry.

The guidelines are designed on a system of training which builds up skills and knowledge in stages as needed by the individual. Each stage is based on a skill or group of skills which analysis shows to be a viable unit in the job situation. Satisfactory completion of the basic training and any one of the following stages should bring a trainee to the standard of a qualified worker. Completion of further stages can then lead to a diversification of skills.

After the basic training the stages need not be completed in the sequence in which they are given here, in fact some may be left out of the training programme altogether. Alternatively, relevant sections may be taken from several of the stages if the resultant programme helps to meet a particular training situation.

Any part of the training may be either on the job or off the job or a combination of the two, although off the job training is regarded as the more effective.

Research suggests that supervised "learning by doing" is more efficient than lengthy verbal explanations and demonstrations, and it is on these principles that the guidelines have been prepared. Because they are intended primarily to assist the training of those entering the industry with no previous knowledge of it, simple basic material has been included. Sections could, however, be included in the training of more experienced workers.

Detailed instructions are not given because of the wide variety of equipment and methods in use. Even where firms follow our guidelines closely they will find it necessary to include specific instructions based on an analysis of their own operations, techniques and approved working methods and to adjust the sequence of stages. Nor is guidance given concerning the time needed to cover stages since this will vary with the individual and the circumstances. Nevertheless, the correct use of the stages should ultimately reduce training times.

Above all, we remind you that this manual is intended as guidance to firms in the preparation of their own training programmes. If it provides a starting point from which effective and properly documented operative training procedures result, it will have achieved its purpose.

The Industry Training Board has already defined the conditions which must be satisfied if training is to rank for grant. Any training process which satisfies these conditions - whether or not it draws upon these guidelines - will so rank.

Finally, in using these guidelines firms are recommended also to refer to the Board's "Recommendations for Training Operatives".

INDUCTION

INTRODUCTION

The object is to give the trainee a general grounding in basic operations, whilst emphasising continuously important aspects of product care, quality production, working method, good housekeeping and accident prevention.

1. THE COMPANY

   (i) Organisation, officers, products and use of products.

   (ii) Welfare facilities, toilets, sports club, canteen, showers.

2. WAGES AND CONDITIONS OF EMPLOYMENT

   (i) Trade agreement.

   (ii) Contracts of employment and conditions.

   (iii) Works/domestic rules and practices (e.g. clocking, disciplinary codes); disputes procedure.

   (iv) Promotion policies.

   (v) Training objectives.

   (vi) Issue of any works handbook.

3. RAW MATERIALS WINNING

   (i) Visit quarry.

   (ii) Strata identification and characteristics of various strata.

   (iii) Methods of quarrying, including use of explosives, dragline and excavators.

   (iv) Methods of handling, weathering, mixing.

   (v) Primary crushing.

   (vi) Quarry hazards.

4. RAW MATERIAL PREPARATION

   (i) Visit stocks of raw materials.

   (ii) Visit to crushing, screening and mixing section.

   (iii) Outline of function, importance of screening, grain size, tempering.

   (iv) Importance of close control of additives.

   (v) Dust control.

   (vi) Hazards.

   (vii) Good housekeeping.

5. MAKING

A. WIRE CUT

(i) Visit to extrusion plant - auger, cutter.

(ii) Importance of moisture content, die size, lubrication of die.

(iii) Automatic control.

(iv) Quality - extrusion faults within control of operator, dimensions, coring, laminations, dogs teeth.

(v) Importance of adhering to approved working methods and of careful handling.

(vi) Hazards.

(vii) Good housekeeping.

B. PRESSED

(i) Visit to press section.

(ii) Types of press - mechanical, hand.

(iii) Different types of pressed brick - soft mud or slop moulded, calcium silicate, semi-dry, stiff plastic.

(iv) Problems of size control, segregation, moisture, mould tolerances.

(v) Quality - aspects within the control of the operator, die size, liners, cleaning.

(vi) Importance of adhering to approved working methods and careful handling.

(vii) Hazards, importance of guards.

(viii) Good housekeeping.

C. HAND-MADE

(i) Visit to hand making section.

(ii) Moulds - importance of cleaning.

(iii) Moisture content of clay, size of clot.

(iv) Throwing, striking and sanding.

(v) Handling of wet bricks - importance of careful handling.

(vi) Hazards.

(vii) Good housekeeping.

6. DRYING

(i) Visit dryers, drying floors.

(ii) Explain sources of heat.

(iii) Importance of drying cycles, temperature control, fuel economy.

(iv) Importance of setting for drying.

(v) Shrinkage problems.

(vi) Fault recognition in dried products - inspection procedures. Causes of fault within operator control.

(vii) Hazards.

(viii) Good housekeeping.

7. FIRING

(i) Visit kilns.

(ii) Importance of firing cycles, temperature control, fuel economy.

(iii) Significance of setting patterns and position in kiln.

(iv) Shrinkage/expansion problems.

(v) Hazards.

(vi) Good housekeeping.

8. DRAWING

(i) Visit drawing area.

(ii) Demonstrate safe drawing methods.

(iii) Demonstrate correct barrow handling.

(iv) Demonstrate correct handling methods.

(v) Hazards.

(vi) Good housekeeping.

9. SORTING, PACKING AND LOADING

(i) Visit stacking and loading bays.

(ii) Demonstrate safe stacking of bricks and blocks - show bonding, chocking.

iii) Fault recognition in fired products - inspection procedures. Causes of fault within operator control.

(iv) Loading, including use of overhead crane and fork-lift.

(v) Banding bricks and blocks.

(vi) Hazards and good housekeeping.

10. RE-CAPITULATION

(i) Questions and answers.

(ii) Re-emphasis of key factors in competent operation and quality production. Stress importance of correct working method, product care and good housekeeping.

(iii) Necessary works demonstration - its purpose and use.

11. INDUSTRIAL SAFETY

(i) Utilise industrial safety section.

(ii) Issue safety codes.

(iii) Allocate trainees to next stage - essentially to be on the job training, subject to normal production conditions but under special instruction when necessary and close supervision.

INDUSTRIAL SAFETY IN THE BRICKS, TILES, REFRACTORIES AND ALLIED INDUSTRIES

(Prepared by the Accident Prevention Committee for the National Federation of Clay Industries)

INTRODUCTION

i) This is NOT intended as an exhaustive guide to accident prevention but as a framework to be clothed with detail based upon unit experience.

ii) Industrial safety is particularly appropriate as part of an induction or basic training programme for new entrants.

iii) It is assumed that detailed safe working practices relevant to particular occupations will feature as an integral part of the training programmes for those operations, i.e. safety cannot be isolated as a special subject.

iv) This training is best preceded by an organised tour round the works.

v) Suitable films, or film strips, can also be featured to add interest.

(Sources: The Industrial Society, Robert Hyde House, 48 Bryanston Square, London, W.1.;
The Royal Society for the Prevention of Accidents, Terminal House, Grosvenor Gardens, London.S.W.1.;
Rank Film Library, 1 Aintree Road, Perivale, Greenford, Middlesex; and
The Central Film Library, Government Building, Bromyard Avenue, Acton, London, W.3.)

THE FACTS

i) Last year in the .... industry (or in this works).... accidents occurred, ... manhours were lost, ... individuals were hurt, each injury involved ..... lost manhours, ... were killed, £..... wages were lost, ... weeks of useful production were lost.

ii) The main causes of accidents were ..... .

iii) A high proportion <u>are</u> avoidable. Many accidents arise from untidiness, momentary carelessness, ignorance, failing to observe proper routes, or to apply approved working practices.

iv) The competent worker is the <u>safe</u> worker. The company has an obligation to provide a safe place of work - the operator has an obligation to himself, his family and his workmates to work safely.

v) Young people, often through high spirits and an under-estimation of risks, are particularly susceptible and can mar their whole lives if involved in a serious accident. The Chief Inspector of Factories' 1965 Report instances young people losing several fingers, being scalped, being crushed when playing on an old hoist, being killed, and receiving various injuries when emulating foolish practices of more experienced workers.

FOOTNOTE

Use statistics published by the industry, by the Chief Inspector of Factories, and those available at works level.

GENERAL SAFETY RULES

i) There is a safe way of doing any job. Make sure you know it and use it - always.

ii) Use the proper tools, e.g. the right size, the right tool for the job. Specify any tasks where it is essential that tools be used instead of hands.
(Give general examples).

Do NOT use defective tools, e.g. splayed spanners, loose hammers, improvised tools. (Give examples).

Make sure your hands will clear obstructions.

iii) Walk - DON'T run (a major cause of falls). Keep to gangways and corridors and keep gangways and staircases clear of obstacles and free from oil and grease.

Keep the workplace tidy, put scrap in bins, tools away. Do not ride improperly on trucks.

Stress the dangers of horseplay and practical jokes.

iv) Avoid loose or torn clothing. If protective clothing is provided on certain tasks - wear it properly.

Demonstrate handpads, masks, goggles, gloves, helmets.

Advise the use of safety shoes, refer to the special clothing necessary for machinery attendants and outline any company arrangements for the purchase of personal protective clothing.

v) Stack safely whether by hand or industrial truck or other lifting device. Demonstrate bonding and choking. Demonstrate the impact from a typical product if dislodged from, say, 6 feet.

vi) Know how to lift and carry manually. Discuss maximum weights for manual lifting; warn about finger traps; discuss lifting methods for blocks, sacks, drums, etc. (Illustrate with Industrial Society or R.O.S.P.A. posters or utilise the Department of Employment & Productivity's safety pamphlet on "Lifting and Handling").

vii) Dangers of compressed air jets. Never direct onto people or their clothes (e.g. No dusting off).

viii) Report anything dangerous, or potentially so, anywhere in the works.

ix) Never tamper with electricity. Report defective wiring or equipment.

x) Discuss the fire drill, the location of apparatus, and emergency exits. Apparatus and exits must be kept clear of obstructions. Types of fire, correct use of extinguishers.

xi) Any "No Smoking" rules.

xii) On machines - particularly powered machines - warn of traps and nips, some of which can be created by the manner in which the operator manipulates materials. Warn particularly of revolving and traversing parts. Generally emphasise that employees must NOT

a) operate any machine, industrial truck, etc. unless fully instructed in it's use

b) adjust any moving part of any machine whilst that machine is operating

c) start any machine unless they know how to stop it and have checked that everyone else is clear

d) use any machine with defective guards - report it

e) operate any machine with guards removed unless specifically authorised and certificated as a machinery attendant duly trained in the dangers. (All machinery attendants must be over the age of 18).

xiii) The precise procedure to be followed if work is necessary in a confined space (e.g. large mixers, mills, boilers) or in any other circumstances where safety depends upon plant being non-operational or upon the absence of fumes.

Describe the safe access permit procedure if used, locking-off or withdrawing switches, use of warning notices and of stand-by men.

USE works rules, industrial safety codes, unit case histories, R.O.S.P.A. and B.S.C. publications, H.M. Factory Inspectors' Reports, Department of Employment and Productivity, Safety, Health and Welfare series.

KNOWN WORKS HAZARDS

i) Typical warning notices and their significance (show samples), discuss the associated hazards.

ii) Scheduled dangerous machinery in the works, e.g. power presses, brick or tile presses, certain wood turning lathes, metal milling machines, guillotines. Discuss special regulations as to training and precautions.

iii) Other hazards revealed by works experience, with emphasis on the approved working practice.

iv) Significance of alarm signals. Describe any fumes, odours, skin sensations, etc., symptoms of danger.

v) Dangers of defective lifting tackle and machines. Works practice as to authorising operators to drive industrial trucks.

vi) Any special procedures in respect of clothing, barrier or protective creams, use of showers, personal cleanliness, medical examinations, etc. which may be peculiar to specified jobs.

GENERAL KNOWLEDGE

i) Any accident prevention committee - its role, organisation and officers. Any works safety officer - his function; alternatively indicate which other person is specifically responsible for works accident prevention.

Outline the procedure to be followed in reporting anything potentially dangerous.

ii) Location of toilets, lockers, showers, first aid kits/ attendants, ambulance room.

iii) Canteen, messroom, tea making facilities, break-time practices.

iv) What to do in the event of an accident, e.g. in the case of a minor injury inform the first aid attendant; first aid should be rendered; the injured man should either be permitted to resume work, be sent or taken home or taken to the nearest hospital casualty department - as seems appropriate.

In the event of more serious injury call the first aid attendants and immediately inform the ambulance service. If the accident is so serious, e.g. representing a danger to life or loss of limb, or the first aid

attendants are otherwise in doubt - then call the nearest doctor as well as the ambulance service. Make arrangements to inform the man's home.

(The associated administrative procedures might also be described e.g. the need for statements from witnesses, for photographs, for informing insurers, etc.).

CONCLUSION

i) The whole emphasis is an ACCIDENT PREVENTION . Incidents which might have caused accidents should be reported if there is any possibility of a preventable recurrence.

ii) If an injury does occur - however slight - it should be properly treated at once utilising the procedures and first aid facilities already described.

PART 1 - RAW MATERIALS WINNING

1. COVERAGE

(i) Visit quarry - types of clay in use.

(ii) Clay identification and characteristics - waste prevention.

(iii) Methods of quarrying including use of explosives, drag-line and excavators.

(iv) Contamination problems - avoidance, good housekeeping.

(v) Correct clay mix.

(vi) Consequences of wrong mix.

(vii) Material control.

(viii) Methods of handling, weathering, mixing.

(ix) Primary crushing.

(x) Quarry hazards.

(xi) Good housekeeping.

2. PLANT TRAINING

NOTE

(a) The following general procedure is necessary for each separately operated piece of plant on which the trainee must become proficient. The training period will accordingly vary with the plant "set up".

(b) The recommended procedure is

(i) demonstrate each main stage in operation until understood

(ii) supervise the trainee in that stage - the cycle being completed as necessary by the instructor or an experienced operator

(iii) continue until the trainee is proficient

(iv) add the next stage and repeat

(v) encourage trainees to ask when uncertain - the instructor intervening otherwise only to prevent mishaps

(vi) when the cycle can be competently completed - concentrate on building up productivity.

(c) What follows is illustrative - each unit must adapt to its own plant . . .

3. GENERAL DEMONSTRATION

The following illustrates in detail the steps of practical training.

(i) Prepare to operate - prior checking procedure (e.g. power on, equipment in operational condition, screens O.K., safety checks made, everyone clear).

(ii) Starting up procedure (in the domestically approved sequence).

e.g. (a) Check materials (if responsible for this).

(b) Any setting up.

(c) Check any pre-set controls are appropriate to specification.

(d) Know how to stop machinery before starting up.

(e) Describe any preliminary control/safety checks (e.g. isolation switches, levers in neutral).

(f) Switching system - sequence.

(g) Other controls e.g. meters, dials, warning signals, gauges - significance and required action.

(h) Fault recognition, e.g. ammeter readings, noise or speed variations, blockages.

(i) Stopping procedures and emergency action.

(j) Any hand tools - proper usage.

4. PRACTICAL TRAINING

1st stage (e.g. Box Feeder)

(i) Prepare to operate.

(ii) Starting up procedure.

(iii) Relevant controls - significance and required action.

(iv) Operating problems - recognition - cause - remedy.

(v) Visual inspection, patrol, routines.

(vi) Interpretation of warning signals both instrumented and based on "know how" (e.g. operating sound).

(vii) Hazards and safe working practices.

Continue practical work - stage 1.

2nd stage (e.g. Primary Crusher)

(1) Prepare to operate.

(ii) Starting up procedure.

(iii) Then as above (iii) - (vii) for stage 2.

Continue practical work extended by other stages as necessary.

5. FAULT RECOGNITION

(i) Fault and operating problems - recheck on recognition, fault, remedy.

(ii) Significance of ammeter readings, noise variations, feeding speeds, blockages, gradings - operator action.

(iii) Fault recognition, continued.

6. GOOD HOUSEKEEPING AND SAFETY

(i) Plant cleaning and any operator maintenance.

(ii) Quarry floor and road cleaning.

(iii) Safety procedures - inspection, cleaning, adjustment, maintenance.

(iv) Cleanliness standards and avoidance of contamination - operating area.

7. PRACTICAL WORK

To be continued over a period until required standard of competance is reached.

All practical work to be under close supervision.

PART 2 - RAW MATERIALS PREPARATION

1. COVERAGE

(i) Visit stocks of raw materials.

(ii) Visit crushing, screening and mixing sections.

(iii) Outline of functions, importance of screening, grain size, tempering.

(iv) Importance of close control of additives.

(v) Dust control.

(vi) Methods - plant in use (use diagrams, models).

(vii) Materials feed.

(viii) Operating problems on each piece of plant - general description.

(ix) Why crush, screen, temper?

(x) Choice of pan - wet or dry?

(xi) Choice of screen.

(xii) Inspection and cleaning of screen.

(xiii) Use of magnets.

(xiv) Hazards and safe working practices.

2. PLANT TRAINING

NOTE

(a) The following general procedure is necessary for each separately operated piece of plant on which the trainee must become proficient. The training period will accordingly vary with the plant set up.

(b) The recommended procedure is

(i) demonstrate each main stage in operation until understood

(ii) supervise the trainee in that stage - the cycle being completed as necessary by the instructor or an experienced operator

(iii) continue until the trainee is proficient

(iv) add the next stage and repeat

(v) encourage trainees to ask when uncertain - the instructor intervening otherwise only to prevent mishaps

(vi) when the cycle can be competently completed - concentrate on building up productivity.

(c) What follows is illustrative - each unit must adapt to its own plant ...

3. GENERAL DEMONSTRATION

The following illustrates in detail the steps for practical training.

(i) Prepare to operate - prior checking procedure, (e.g. power on, equipment in operational condition, screens O.K., safety checks made, everyone clear).

(ii) Starting up procedure (in the domestically approved sequence).

e.g. (a) Check materials (if responsible for this).

(b) Any setting up.

(c) Check any pre-set controls are appropriate to specification.

(d) Know how to stop machinery before starting up.

(e) Describe any preliminary control/safety checks (e.g. isolation switches, levers in neutral).

(f) Switching system - sequence.

(g) Other control e.g. meters, dials, warning signals, gauges - significance and required action.

(h) Stopping procedures and emergency action.

(i) Any hand tools - proper usage.

4. PRACTICAL TRAINING - PROCEDURE

1st stage (e.g. Pan)

(i) Prepare to operate.

(ii) Starting up procedure.

(iii) Relevant controls - significance and required action.

(iv) Operating problems - recognition - cause - remedy.

(v) Visual inspection, patrol routines.

(vi) Interpretation of warning signals both instrumented and based on "know how" (e.g. operating sounds).

(vii) Hazards and safe working practices.

Continue practical work - stage 1.

2nd stage (e.g. Box Feeder)

(i) Prepare to operate.

(ii) Starting up procedure.

(iii) Then as above (iii) - (vii) for stage 2.

Continue practical work extended by other stages as necessary, or utilise other procedures relevant to screening, storage.

5. SCREENING

(i) Purpose of screening.

(ii) Types of screen used.

(iii) Choice of screen.

(iv) Screening efficiency.

(v) Screen inspection procedures.

(vi) Use of magnets.

(vii) Faults - recognition, cause, remedy.

(viii) Screen changing.

(ix) Hazards.

6. STORAGE

(i) Storage methods - reasons for storage.

(ii) Elevators - location, controls, safety.

(iii) Conveyors - location, controls, safety.

(iv) Storage hoppers - capacity, access, safety.

(v) Flow routes for materials - how and when to change. Consequences of mixed materials. Any colour code system on pipes/trunking.

(vi) Materials identification system for hoppers.

(vii) Practical work - operate, starting-up.

(viii) Hazards - and safe working procedures.

7. MIXING - PRINCIPLES

(i) Product density - its importance.

(ii) Achieving density.

(iii) Particle size - importance. Measurement and control.

(iv) Critical importance of moisture content.

(v) Method of water addition.

(vi) Additives.

8. MIXING - PROCEDURE

(i) Check materials availability.

(ii) Check pre-set controls.

(iii) Check doors, flaps in correct position.

(iv) Know how to stop machinery before starting up.

(v) Check everything and everyone clear before starting up.

(vi) Consequences of non-observance of specification or procedure.

(vii) Hazards - use of guards, hand tools, protective clothing.

9. FAULT RECOGNITION

(i) Faults and operating problems: recheck on recognition - cause - remedy.

(ii) Significance of ammeter reading, noise variations, feeding speeds, blockages, gradings, holed screens - operator action.

Fault recognition continued.

10. GOOD HOUSEKEEPING AND SAFETY

(i) Plant cleaning and any operator maintenance.

(ii) Safety procedures - inspection, cleaning, adjustments, maintenance.

(iii) Cleanliness standards and avoidance of contamination - operating area.

11. PRACTICAL WORK

Practical work continued, under close supervision.

PART 3 - MAKING

3 (1) WIRE CUT SECTION

1. COVERAGE

(i) Visit to extrusion plant - auger, cutter. Augers and cutters are scheduled as dangerous machines - hazards and safe working practices. Operation and use of guards. Protective clothing, prohibited practices.

(ii) Importance of moisture content, die size, lubrication of die.

(iii) Automatic controls.

(iv) Quality - faults within the control of the operator, dimensions, coring, laminations, dogs teeth.

(v) Changing wires - safety aspect must be very strongly stressed.

(vi) Importance of adhering to approved working methods and of careful handling.

(vii) Specification - operator responsibilities.

(viii) Correct handling of wet bricks - prevention of damage.

(ix) Sanding process - colour mix, identification of different colours, colour/sand ratio - dust control.

(x) Types of bricks, different faces.

(xi) Fault recognition - causes and remedies.

(xii) Use of any tools.

(xiii) Hazards.

2. PLANT TRAINING

(a) The recommended procedure is

(i) make auger and cutter available purely for training purposes, i.e. free from normal production pressures

(ii) demonstrate each phase or station in the operation until understood - the cycle being completed as necessary by the instructor or an experienced operator

(iii) supervise the trainee in that stage (station) until proficient

(iv) add the next stage (station) and repeat

(v) encourage trainees to ask when uncertain - instructors otherwise intervening only to prevent mishaps

(vi) when the cycle can be competently completed - build up productivity.

(b) What follows is illustrative - each unit must adapt to its own plant ...

3. GENERAL DEMONSTRATION

(i) Prepare to operate - i.e. prior checking procedure (e.g. power on, equipment in operational condition, guards in position, everyone clear).

(ii) Starting up procedure (in domestically approved sequence).

(a) Any setting up.

(b) Are pre-set controls appropriate to specification.

(c) Materials - available and correct.

(d) Cutting wire fitted and correct.

(e) Know how to stop before starting up.

(f) Pre-operational control/safety check (i.e. isolation switches, levers in neutral).

(g) Auger controls - sequence of operation.

(h) Significance of meters, dials, pressure gauges, warning signals - action required.

(i) Stopping and emergency procedures.

(j) Use of oils, scrapers.

(k) Auger and cutter adjustment within operator's responsibility.

4. PRACTICAL TRAINING - PROCEDURE

(i) Prepare to operate.

(ii) Starting up procedure.

(iii) Practise stopping - to gain confidence.

(iv) Operate.

Continue practical work.

5. FAULT RECOGNITION

(i) Re-demonstrate gauging.

(ii) Visual inspection - fault recognition and remedial action ...

(a) lamination

(b) tolerances and size control, distortion

(c) faulty batches - recognition

(d) acceptable/rejection standard, inspection drill

(e) reject disposal procedure.

(iii) Taking off - lifting and stacking techniques.

Practise gauging, inspection, fault recognition to standard, taking off.

6. PRACTICAL TRAINING - CONTINUED

Continue operation, taking off and allied gauging/inspection.

(i) Different dies - die wear.

(ii) Importance of dies - correct to size, cleaned and changed as necessary.

(iii) Symptoms of die trouble - remedial action.

(iv) Cutting wire wear - when to change wires.

(v) Disposal of broken wires.

(vi) Disposal of waste clay.

(vii) Other operating problems - recognition - cause - remedy.

7. GOOD HOUSEKEEPING AND SAFETY

(i) Good housekeeping - operating area cleanliness - material recovery practices.

(ii) Safe working practices - inspection, adjustment, cleaning, maintenance.

(iii) Necessary documentation - required operator action.

8. RECAPITULATION

(i) Question and answer session on programme to date.

Re-emphasise:

(ii) Key aspects of operations.

(iii) Safe working procedures.

(iv) Quality standards - aspects within operator control.

Shape, fault recognition test.
Operating problems - remedial action test.

9. PRACTICAL TRAINING - CONTINUED

Auger operation - as a supernumerary and under supervision.

3 (2) PRESS SECTION

1. COVERAGE

(i) Visit to press section.
Presses are scheduled as dangerous machines - hazards and safe working procedures. Operation and use of guards. Any protective clothing. Prohibited practices.

(ii) Types of press in use (hydraulic, mechanical, electronic).

(iii) Importance of size control - segregation, moisture, mould tolerances.

(iv) Quality aspects within operator control - corners, edges, dimensions, distortions, die size, liners, cleaning.

(v) Products for presses. Press loading considerations.

(vi) Handling unfired products - at press - to pallet - to kiln car - to dryer car - to barrow.

(vii) Use of any hand tools, handtrucks, mobile stillages.

(viii) Hazards - importance of guards.

(ix) Good housekeeping.

2. PLANT TRAINING

(a) The following general procedure is necessary for each type of press on which the trainee must become proficient. The total training period will vary accordingly.

(b) The recommended procedure is:

(i) conduct as much of the initial training as possible on press "mock ups" and later make presses available purely for training purposes, i.e. free from normal production pressures

(ii) demonstrate each phase or station in the operation until understood - the cycle being completed as necessary by the instructor or an experienced operator

(iii) supervise the trainee in that stage (station) until proficient

(iv) add the next stage (station) and repeat

(v) encourage trainees to ask when uncertain - instructors otherwise intervening only to prevent mishaps

(vi) when the cycle can be competently completed - build up productivity.

(c) What follows is illustrative - each unit must adapt to its own plant...

3. GENERAL DEMONSTRATION

(i) Prepare to operate - i.e. prior checking procedure (e.g. power on, equipment in operational condition, guards in position, everyone clear).

(ii) Starting up procedure (in domestically approved sequence).

(a) Any setting up.

(b) Are pre-set controls appropriate to specification (e.g. operating pressures, dwell time, pressing cycle).

(c) Materials - available and correct.

(d) Mould box fitted and correct.

(e) Know how to stop before starting up.

(f) Pre-operational control/safety check (e.g. isolation switches, levers in neutral).

(g) Press controls - sequence of operation.

(h) Significance of meters, dials, pressure gauges, warning signals, action required.

(i) Stopping and emergency procedures.

(j) Use of oils, mould/plate brushes, scrapers, rammers.

(k) Press adjustment within operator's responsibility.

4. PRACTICAL TRAINING preceded by practical demonstration.

(i) Prepare to operate.

(ii) Starting up procedure.

(iii) Practise stopping - to gain confidence.

(iv) Operate.

Continue practical work.

5. GOOD HOUSEKEEPING AND SAFETY

(i) Good housekeeping - operating area cleanliness - material recovery practices.

(ii) Safe working practices - inspection, adjustment, cleaning, maintenance.

(iii) Necessary documentation - required operator action.

6. RECAPITULATION

(i) Question and answer session on programme to date.

Re-emphasise:

(ii) Key aspects of competent press operation.

(iii) Safe working procedures.

(iv) Quality standards - aspects within operator control.

Shape, fault recognition, test.
Operating problems - remedial action test.

7. PRACTICAL TRAINING CONTINUED

Press operation - as a supernumerary and under supervision.

3 (3) HAND MOULDING SECTION

1. COVERAGE

(i) Visit to hand making section.

(ii) Moulds - importance of cleaning, lubricating.

(iii) Moisture content of clay - "feel".

(iv) Size of clot.

(v) Forming brick - throwing, striking, sanding.

(vi) Lifting from mould - care in handling.

(vii) Special shapes.

(viii) Practise handling - lifting and placing.

(ix) Handling pallets.

(x) Good housekeeping.

(xi) Physical build-up.

2. PRACTICAL TRAINING PROCEDURE

1. (i) Exhibition of green shapes/sizes.

(ii) Shape recognition and usage.

(iii) Operating faces.

(iv) Shape recognition tests.

2. (i) Handling the simpler unfired products - at bench, to pallet, kiln or dryer car/floor.

(ii) Gauging - how and where. Gauges in use. Checking gauges.

(iii) Manual lifting techniques. Avoidance of strains and traps. Any mechanical aids.

(iv) Practice handling to get "feel". Avoidance of product damage (use of hand pads/gloves).

3. (i) Weighing or volume filling techniques.

(ii) Importance of accuracy.

(iii) Use of scales, scoops or other mould filling apparatus.

4. (i) Types and assembly of moulds.

(ii) Mould throwing and striking - approved practices. Weak spots in particular shapes.

(iii) Throwing techniques.

(iv) Lubricating moulds.

(v) Sanding.

(vi) Stacking, palletising.

(vii) Hazards - safe working procedures.

5. (i) Any special additives to batch - approved procedures.

(ii) Mould filling, throwing, striking, sanding, practical work continued.

6. Practical work continued.

3. FAULT RECOGNITION

1. (i) Quality standards - acceptable/rejects.

(ii) Faulty batches - recognition (e.g. too coarse, too dry, too wet, additives missing).

(iii) Consequences e.g. slumping, squatting, distortion - remedies.

(iv) Visual inspection ...

Cracking, segregation, lamination, distortion.

(v) Causes and remedies - operator's responsibility.

2. (i) Faults attributable to moulds - recognition and remedy.

(ii) Mould adjustment - use of packers and liners.

(iii) Operator's responsibility for mould inspection, accuracy.

(iv) Faults attributable to faulty filling and impacting - recognition and remedy.

3. (i) Examples of typical faults.

(ii) Fault recognition tests.

4. GOOD HOUSEKEEPING

(i) Storage arrangements - raw materials, finished products, tools.

(ii) Operating area cleanliness.

(iii) Material recovery practice.

5. RECAPITULATION

Re-emphasise...

1. (i) Key aspects of mould assemblies and dismantling.

(ii) Key aspects of filling, levelling and compacting.

(iii) Particular making problems on difficult products.

(iv) Hazards and safe working procedures.

(v) Quality standards - aspects within operator's control.

2. (i) Question and answer session on programme to date.

(ii) Necessary documentation - required operator action.

6. PRACTICAL WORK

Practical work continued - build up productivity.

7. FURTHER TRAINING

Practical work - preferably on work of phased difficulty - continued under supervision.
Special instruction in making techniques for shapes not hitherto encountered.

Footnote

The total training period will inevitably depend upon the extent to which specialised knowledge is necessary to the manufacture of difficult products infrequently made.

PART 4 - SETTING

INTRODUCTION

Setting patterns derive from product characteristics and behaviour and product mix and are influenced also by type of kiln. The detail of setting activity may vary greatly from week to week according to the type of ware passing through.

It is recommended that much of the setter's initial training be arranged off the job and away from normal production pressure. Initial handling and setting of green ware can take place in training conditions which simulate the floors of kilns or decks of kiln cars, utilising reject products. On the other hand it is undesirable to isolate the trainee completely from the work place atmosphere and the later part of the training period should be spent working in the vicinity of the normal setter's area but preferably with a special training squad. Further time could then be spent preferably with the new squad or as a supernumerary working with experienced setter's - in either case subject to normal production conditions.

It is important that new trainees should be limited to short spells of manual work until the necessary dexterity is acquired and muscular adjustment takes place, then building up gradually to the required productivity levels.

NOTE

Insofar as setting pattern is a function of kiln type/ characteristics it is here assumed that - where a choice between kilns is possible and necessary - the setter will receive instructions from elsewhere as to which kiln should be used. This section of the training does not incorporate material directed at fitting him for this type of decision.

1. BACKGROUND INFORMATION

(i) Types of kiln in use (e.g. oil, coal, gas fired, tunnel kilns, intermittent, continuous, clamp).

(ii) Types of firing in use, e.g. reducing atmospheres, oxidising.

(iii) Factors relevant to setting, e.g. flame impingements, effect of temperature on setting positions, flame dykes.

(iv) Examples of how product or kiln characteristics affect setting pattern.

(v) The general objectives of good setting.

2. PRODUCT HANDLING

(a) (i) Handling unfired products - from press to kiln car, dryer car to kiln car, barrow to kiln floor.

(ii) Lifting and placing techniques. (Avoidance of strains and traps). Any mechanised aids. Handling and stacking heavy or awkward blocks).

(iii) Practise handling to get "feel" and avoid product damage, (use of hand pads/gloves).

(b) (i) Product faults - rubbed edges, chipped corners, warpage.

(ii) Inspection procedure and standards whilst setting. Reject disposal procedure.

(iii) Cost of careless handling - additional cost of firing rejects - setter's responsibilities.

(iv) Handling, placing, fault recognition practice.

3. SETTING PROCEDURES

(a) (i) Condition of tunnel kiln car deck (or kiln floor) prior to setting. Inspection procedures and standards required.

(ii) Sanding and levelling.

(iii) Importance, and achievement, of vertical setting. Typical examples of bending or bridging blades - avoidance of reeling - use of spacers.

(iv) Factors affecting setting heights (temperature gradients, strength, size in mixed batches).

(v) Any hazards. Safe working practices. Prohibited practices.

(vi) Practise vertical setting, (preferably working in teams and 'handing up').

Practical work continued.

(b) (i) Documentation in use - e.g. records of ware set, ware rejected etc. Importance of accuracy.

(ii) Practical work continued - with documentation.

4. (i) Sorting sizes and qualities into congenial setting groups.

(ii) Factors to be considered (e.g. top and bottom setting, products requiring boxes, saggers or pockets.

(iii) Products able to withstand direct heat - placing in kiln or on car.

(iv) Avoidance of unnecessary drawing problems (e.g. arising from a mixture of close sizes). Avoid unnecessary lifting by low setting heavy blocks where practicable.

(v) Practical work sorting for setting.

Practical work continued.

5. (i) Spacing off when setting - principles to follow. Heat distribution problems.

(ii) Use of kiln furniture to make kiln bottoms and setting benches.

(iii) Spacers and ties.

(iv) Making pockets and boxes. Products to be placed therein.

(v) Demonstrate faults attributable to wrong spacing (e.g. coring).

(vi) Avoidance of flashing, fly ash contamination, crazing.

(vii) Any hazards. Safe working practices. Any special problems resulting from additives.

Practical work continued.

6. (i) Importance of setting to prescribed patterns.

(ii) Typical setting patterns (including use of furniture, pocketing, bridging).

(iii) Demonstrate faults resulting from bad setting (e.g. cracking attributable to jointing or overlapping).

(iv) Seger cones and other temperature indicators - use and placing.

(v) Economic use of kiln/car space.

(vi) Sticking and fusing problems - use of setting, levelling, parting media and loose fill.

(vii) Issue any available setting diagrams.

(viii) Any protective materials used when transporting/ stacking/setting green ware.

7. Any hand tools, mobile stillages, hand trucks, barrows, in use. Knacks and approved working method.

Practical work continued.

8. Depth of setting - approved practices and problems.

e.g. (i) Squatting (use of stable products for bottom setting).

(ii) Bending and warping (importance of flat base).

(iii) Shrinkage - variations between top and bottom setting. Setter's responsibility for placing ware correctly.

(iv) Demonstrate approved setting depths.

(v) Demonstrate faults attributable to wrong setting depths.

Practical work continued.

9. GOOD HOUSEKEEPING AND SAFETY

(i) Safe working practices - recapitulation. Any protective clothing. Prohibited practices.

(ii) Operating area cleanliness - required standards.

(iii) Rejected material - disposal practice.

(iv) Standard required for empty dryer cars/pallets.

10. RECAPITULATION

(i) Question and answer session on programme to date.

(ii) Explanation of special terms.

(iii) Re-emphasise...

Key aspects of handling
Key aspects of quality within setter's control.

Remainder of the training time - Practical work, either as a supernumerary with experienced setters or preferably in the newly trained squad, under supervision, but subject to normal production conditions.

PART 5 - DRAWING

INTRODUCTION

It is recommended that much of the drawer's initial training be arranged off the job and away from normal production pressures. Initial handling of burnt ware can take place in training conditions which simulate the floors of kilns (or utilise unused kilns) and the decks of kiln cars - utilising reject burned products.

As it is undesirable to isolate trainees completely from the work place atmosphere, it is suggested that the later part of the training period should be spent working in the vicinity of the normal drawing area, but preferably with a special training squad. Further time could be spent preferably with the new squad or as a supernumerary working with experienced drawers - in either case subject to normal production conditions.

It is important that new trainees should be limited to short spells (say half an hour) of manual work - interspersed with other training activities - until the necessary dexterity is acquired and muscular adjustment takes place, then building up gradually to the required productivity levels.

1. PRODUCT HANDLING

(i) Handling fired products - from kiln or kiln car to barrow or pallet.

(ii) Lifting and placing/stacking techniques. Avoidance of strains, traps and product damage. Use of gloves/hand pads.

(iii) Use of barrows, mobile trucks/stillages. Loading techniques and knacks (e.g. movement economy, placing of hands, point of balance, entering wickets).

(iv) Use of other hand tools.

(v) Use of any protective materials when stacking.

(vi) Hazards and safe working procedures. Prohibited practices. Any protective clothing.

Handling, loading and unloading, shape recognition - practical work.

Practical work continued.

2. (i) Kiln/car cooling procedures.

(ii) Sequence for drawing activity in kilns, i.e. where to start and why.

(iii) "Passing down" from top setting - approved practices.

(iv) Avoidance of product damage by careless handling (e.g. chipping, spoiled corners and edges).

(v) Kiln furniture - recognition and disposal procedure.

(vi) Any mechanical aids.

(vii) Correct pallets for products (e.g. export practices).

Practical work continued.

3. FAULT RECOGNITION

(i) Drawer's inspection responsibilities - approved working practice (i.e. inspection drill).

(ii) Fault recognition - i.e. cracks, poor corners/edges, crazing, distortion, lamination, under/over burning. Acceptable/reject standards.

(iii) Fault recognition and random sorting/inspection exercises.

(iv) Disposal procedure - rejected ware.

(v) Documentation - recording of good/reject ware.

Handling, fault recognition, sorting/inspection, loading and unloading, documentation - practical work continued.

4. DRAWING PRACTICE

(i) Standard loads and pallet stacking patterns.

(ii) Requirements of particular customers - importance of compliance.

(iii) Stacking difficult/awkward shapes.

(iv) Procedure for ascertaining any special instructions governing packing to pallet.

Continue practical work - build up productivity.

5. RECAPITULATION

(i) Questions and answers on programme to date.

(ii) Operating area cleanliness - required standards.

(iii) Re-emphasise...

Key aspects of handling.
How to avoid product damage.
Inspection standards/drill.

Practical work continued.

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6. REMAINDER OF TRAINING PERIOD

Practical work - either as a supernumerary with experienced drawers or preferably in the newly trained squad, under supervision subject to normal production conditions.

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